AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-8. (canceled)

9. (currently amended) A semiconductor layer having a double hetero mesa-stripe serving as a first semiconductor laminated product including at least a quantum well active layer formed by selective growth on a semiconductor substrate, and recombined layers serving as second semiconductor laminated products simultaneously formed on both the sides of the double hetero mesa-stripe at a predetermined interval in the selective growth, wherein

when an average strain amount ε(average) and a critical strain amount ε(critical) are defined by the following equations:

[Equation 1]

$$\varepsilon\,(\text{average}) = \frac{\sum_{i=1}^{n} (\varepsilon_i \times d_i)}{d} \qquad d = \sum_{i=1}^{n} d_i$$

where the number of strained semiconductor layers is represented by j, the number of unstrained semiconductor layers sandwiched by the strained semiconductor layers is represented by k, and a

strain amount of an i-th semiconductor layer and a thickness of the i-th semiconductor layer in the double hetero mesa-stripe or the recombination layers obtained by laminating n (n = j + k) semiconductor layers are represented by εi and di, respectively,

[Equation 2]

$$\cancel{\varepsilon(\text{critical}) = \frac{b}{4\pi d} \cdot \frac{(1-p\cdot(\cos\alpha)\hat{}2)}{(1+p)\cdot\cos\lambda} \cdot \{\ln(\frac{d}{b}) + 1\}}$$

$$\varepsilon(\text{critical}) = \frac{b}{4\pi d(\text{critical})} \cdot \frac{1-p\cdot(\cos\alpha)\hat{}2)}{(1+p)\cdot\cos\lambda} \cdot \{\ln(\frac{d(\text{critical})}{b}) + 1\}$$

where

b: Strength of Burgers vector,

p: Poisson's ratio

α: angle between a dislocation line and its Burgers vector

λ: angle between a slip direction and a direction perpendicular to cross lines of a slip surface and a laminate surface and being in the laminate surface,

an average strain amount ε1(average) of the double hetero mesa-stripe is a compression strain (ε1(critical) ≥ ε1(average) > 0, and

an average strain amount $\varepsilon 2$(average) of the recombination layer is a tensile strain ($-\varepsilon 2$(critical) $\leq$ $\varepsilon 2$(average) < 0) not more than a critical strain amount $\varepsilon 2$ (critical) or zero strain ($\varepsilon 2$(average) $= 0$).

10. (previously presented) The semiconductor laser according to claim 9, wherein the double hetero mesa-stripe includes at least an optical confinement layer and a quantum well active layer.

11. (previously presented) The semiconductor laser according to claim 9, wherein the double hetero mesa-stripe contains AlInAs or AlGaInAs.

12. (previously presented) The semiconductor laser according to claim 10, wherein the double hetero mesa-stripe contains AlInAs or AlGaInAs.

13. (previously presented) The semiconductor laser according to claim 9, wherein a distance between the double hetero mesa-stripe and the recombination layer is 15 μm or less.

14. (currently amended) A method of manufacturing a semiconductor laser comprising:

forming a pair of stripe-shaped dielectric masks on a semiconductor substrate; and

forming a double hetero mesa-stripe serving as a first semiconductor laminated product including an active layer in a narrow portion sandwiched by the dielectric masks; and the step of, at the same time, forming recombination layers serving as second semiconductor laminated products in broad portions on both the outsides of the dielectric masks, wherein

when an average strain amount ε(average) and a critical strain amount ε(critical) are defined by the following equations:

[Equation 3]

$$\varepsilon\ (\text{average}) = \frac{\sum_{i=1}^{n} (\varepsilon i \times di)}{d} \qquad d = \sum_{i=1}^{n} di$$

where the number of strained semiconductor layers is represented by j, the number of unstrained semiconductor layers sandwiched by the strained semiconductor layers is represented by k, and a strain amount of an i-th semiconductor layer and a thickness of the i-th semiconductor layer in the double hetero mesa-stripe or the recombination layers obtained by laminating n (n = j + k) semiconductor layers are represented by εi and di, respectively,

[Equation 4]

$$\cancel{\varepsilon\,(\text{critical}) = \frac{b}{4\pi d} \cdot \frac{(1-p\cdot(\cos\alpha)\hat{}2)}{(1+p)\cdot\cos\lambda} \cdot \{\ln(\frac{d}{b}) + 1\}}$$

$$\underline{\varepsilon(\text{critical}) = \frac{b}{4\pi d(\text{critical})} \cdot \frac{1-p\cdot(\cos\alpha)\hat{}2)}{(1+p)\cdot\cos\lambda} \cdot \{\ln(\frac{d(\text{critical})}{b}) + 1\}}$$

where

b: Strength of Burgers vector,

p: Poisson's ratio

α: angle between a dislocation line and its Burgers vector

λ: angle between a slip direction and a direction perpendicular to cross lines of a slip surface and a laminate surface and being in the laminate surface,

an average strain amount ε1(average) of the double hetero mesa-stripe is a compression strain (ε1(critical) ≥ ε1(average) > 0, and

an average strain amount ε2(average) of the recombined layer is a tensile strain (-ε2(critical) ≤ ε2(average) < 0) not more than a critical strain amount ε2(critical) or zero strain (ε2(average) = 0).

15. (previously presented) The method of manufacturing a semiconductor laser according to claim 14, wherein the double hetero mesa-stripe includes at least an optical confinement layer and a quantum well active layer.

16. (previously presented) The method of manufacturing a semiconductor laser according to claim 14, wherein the double hetero mesa-stripe contains AlInAs or AlGaInAs.

17. (previously presented) The method of manufacturing a semiconductor laser according to claim 15, wherein the double hetero mesa-stripe contains AlInAs or AlGaInAs.

18. (previously presented) The method of manufacturing a semiconductor laser according to claim 14, wherein a distance between the double hetero mesa-stripe and the recombination layer is larger than 0 and not more than 15 μm.

19. (previously presented) The semiconductor laser according to claim 9, wherein the double hetero mesa-stripe comprises:

a first optical confinement layer;

the quantum well active layer on the first optical confinement layer;

a second optical confinement layer on the quantum well layer; and

a cap layer on the second optical confinement layer.

20. (previously presented) The semiconductor laser according to claim 19, wherein

the first optical confinement layer comprises n-type AlGaInAs,

the second optical confinement layer comprises p-type AlGaInAs, and

the cap layer comprises InP.

21. (previously presented) The semiconductor laser according to claim 9, wherein a p-type InP current blocking layer is provided only on both sides of the double hetero mesa-stripe, and a p-type cladding layer is formed above the double hetero mesa-stripe.

22. (previously presented) The method of manufacturing a semiconductor laser according to claim 14, wherein the double hetero mesa-stripe comprises:

a first optical confinement layer;

the quantum well active layer on the first optical confinement layer;

a second optical confinement layer on the quantum well layer; and

a cap layer on the second optical confinement layer.

23. (previously presented) The method of manufacturing a semiconductor laser according to claim 14, wherein

the first optical confinement layer comprises n-type AlGaInAs,

the second optical confinement layer comprises p-type AlGaInAs, and

the cap layer comprises InP.

24. (previously presented) The method of manufacturing a semiconductor laser according to claim 14, wherein a p-type InP current blocking layer is provided only on both sides of the double hetero mesa-stripe, and a p-type cladding layer is formed above the double hetero mesa-stripe.

25. (new) The semiconductor laser according to claim 9, wherein the average strain amount $\varepsilon 1$(average) of the double hetero mesa-stripe is shifted to a compression-strain side within the critical strain amount ε(critical) to reduce the tensile strain amount $\varepsilon 2$(average) of the recombination layer.

26. (new) The semiconductor laser according to claim 9, wherein the average strain amount $\varepsilon 1$(average) of the double hetero mesa-stripe and the average strain $\varepsilon 2$(average) of the recombination layer is shifted to a compression-strain side by compressive strain given to optical confinement, both the $\varepsilon 1$(average) of the double hetero mesa-stripe and the average strain $\varepsilon 2$(average) of the recombination layer are the critical strain amount ε(critical) or less.

27. (new) The method of manufacturing a semiconductor laser according to claim 14, wherein the average strain amount $\varepsilon 1$(average) of the double hetero mesa-stripe is shifted to a compression-strain side within the critical strain amount ε(critical) to reduce the tensile strain amount $\varepsilon 2$(average) of the recombination layer.

28. (new) The method of manufacturing a semiconductor laser according to claim 14, wherein the average strain amount $\varepsilon 1$(average) of the double hetero mesa-stripe and the average strain $\varepsilon 2$(average) of the recombination layer is shifted to a compression-strain side by compressive strain given to optical confinement, both the $\varepsilon 1$(average) of the double hetero mesa-stripe and the average strain $\varepsilon 2$(average) of the recombination layer are the critical strain amount ε(critical) or less.